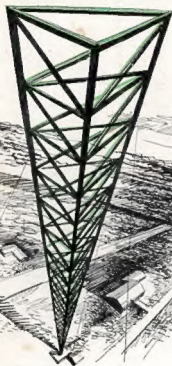


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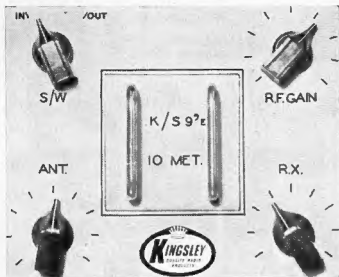


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EDITORIAL



The Editorial for September advised you that your Federal Executive was seeking definitions of British and American standards covering frequency modulation technique. Information received from A.R.R.L. Headquarters indicates that two sets of standards are being adopted in U.S.A., namely:—

- (1) Use of all types of frequency modulation, including wide band, on the following bands: industrial heating or diathermy band 29-29.7 Mc., 52.5-54 Mc. all bands above 144 Mc.
- (2) Use of narrow band frequency modulation for one year's test on 3850-3900, 14200-14250 and 28500-29000 Kc. bands.

It is interesting to note that Federal Communications Commission (U.S.A.) has defined narrow band frequency modulation as a "system of frequency modulation where the peak deviation is limited to a value equal to or less than the maximum modulation frequency." In other words, the band width must not exceed that occupied by an amplitude modulated sig-

nal of the same audio characteristics.

Federal Executive recommends adoption by Australian Amateurs of the following standard:

Maximum modulation frequency: 3500 cycles.

Peak deviation: ± 5000 cycles.

Insofar as Pulse Technique is concerned, the setting up of standards must be deferred until such time as privileges are extended to pulse modulation. The only requirement for pulse transmission, for which stations are at present licenced, is that the combination of pulse length and repetition frequency selected should be such that "average power" does not exceed licenced value.

Once more those who intend to make use of these new types of transmission are advised to be cautious in their choice of technical equipment and methods. Consider carefully all the factors involved before plunging haphazardly along the wrong road. A little thought will pay big dividends.

G.G.

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THE CRYSTAL FILTER

By G. W. NEILSON*

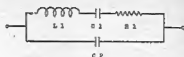
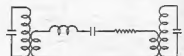
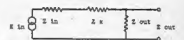


FIG. 1. EQUIVALENT CRYSTAL CIRCUIT



BASIC CRYSTAL FILTER CIRCUIT



EQUIVALENT ELECTRICAL CIRCUIT

FIG. 2.

TABLE 1

Frequency Resonance	Crystal Z 3,500 ohms	Output attenuation for various output Z			
		250,000	50,000	15,000	5,000 ohms
0.125 Kc. off	10,000 "	0.2 db	0.8 db	2.5 db	6.0 db
0.25 " "	20,000 "	0.4 " "	1.9 " "	5.1 " "	10.8 " "
0.5 " "	40,000 "	0.7 " "	3.2 " "	7.8 " "	14.6 " "
1.0 " "	80,000 "	1.4 " "	5.5 " "	11.8 " "	19.5 " "
2.0 " "	160,000 "	2.5 " "	9.0 " "	19.0 " "	25.0 " "
4.0 " "	320,000 "	5.0 " "	14.0 " "	21.0 " "	31.0 " "
8.0 " "	640,000 "	10.0 " "	19.0 " "	27.0 " "	38.0 " "
		18.0 " "	26.0 " "	33.0 " "	42.0 " "

It can be seen that the output voltage can be calculated from the equation:—

$$E_{out} = \frac{Z_{out}}{Z_{in} + Z_{x} + Z_{out}} E_{in} \quad (1)$$

At resonance when Z_{in} plus Z_{x} is small Z_{out} can be varied over at least a 50 to 1 range with very little effect on the output voltage, when Z_{out} is equal to Z_{in} plus Z_{x} the output voltage is reduced to half or in other words 6 db. This is usually considered the minimum permissible. By varying this output impedance the selectivity of the filter can be controlled. If in Fig. 2 the input impedance is given a value of 2,000 ohms and the output impedance is varied over four steps of 250,000 ohms, 50,000 ohms, 15,000 ohms and 5,000 ohms the attenuation in db obtained at the frequencies shown in Table 1 is given.

This is the principle of the most popular filter of the present day. The input impedance consists of a low impedance secondary, which is untuned, coupled to a tuned primary, while the output impedance is a high impedance tuned coil. This high impedance is obtained by using reasonably high Q—about 70 to 100—and fairly low tuning capacity—about 70 to 100 mmfd. This output impedance is varied by switching

resistance in series with the coil, shunting resistance across the coil or detuning the coil. As the resistance in series with the coil is increased the Q is reduced, so lowering the impedance of the tuned circuit. Similarly as resistance is shunted across the coil the impedance is reduced. Thirdly, of course, the impedance of a tuned circuit is maximum when tuned to resonance. In early crystal filters the selectivity was controlled by varying the input impedance. The input coil was usually an i.f. transformer with tuned secondary and detuning this secondary controlled the selectivity. The main disadvantage of this type was the fact that as the secondary was detuned the voltage applied to the crystal was also reduced and quite often resulted in a serious loss in output.

THE PHASING CONDENSER

The effects of the shunt capacity of the crystal must now be considered. Re-drawing the equivalent circuit it can be seen that the effect of the shunt capacity is to give a parallel resonant circuit instead of the usual series resonant, see Fig. 3. The frequency of parallel resonance is slightly higher than that of series resonance due to the two capacities being in series, the resultant capacity being slightly smaller—C2 is usually

It was first suggested for this work by an Englishman by the name of Dr. Robinson but due credit must go to the American Lamb who was responsible for the first practical design of a Crystal Filter. Since Lamb's work, the Filter has gone through much developmental work and today is a device readily usable on phones as well as c.w. In contrast to the old Filters which were satisfactory on c.w. only due to their inability to supply selectivity variations to suit both types of reception.

PRINCIPLE OF OPERATION

The Quartz Crystal can be represented electrically by the approximation shown in Fig. 1 as an inductance, capacitance and resistance in series shunted by an additional capacitance. The series element corresponds to the equivalent series resonance of the crystal, in other words the frequency at which it oscillates, the resistance corresponding to the losses caused by inertia, friction, etc., and of course governs the equivalent Q of the crystal. The shunt element corresponds to the capacity of the crystal holder and any other stray capacity which might be shunted across the crystal. Typical values for a 455 Kc. crystal as shown in Fig. 1 are: L1 7 henries, C1 0.02 mmfd., C2 10 mmfd., R1 3,000 ohms, which is equivalent to a Q of 7,000 approx. It will be observed that the resistance values are considerably different to those normally associated with frequencies of 455 Kc.

It is now necessary to arrange this somewhat complex and unusual resonant device in a circuit that will control the selectivity of a receiver. As the crystal is fundamentally a series resonant device it is invariably used as a selective coupler between two circuits—usually tuned. This is shown in Fig. 2. For the present the shunt capacity has been neglected and will be dealt with later. In the equivalent circuit it can be seen that it can be regarded as three impedances in series consisting of the input impedance, the crystal impedance and the output impedance. The input

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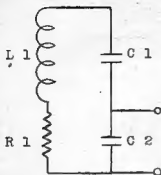


Fig 5—Equivalent Electrical Circuit, showing Parallel Resonant Effect

large in relation to C1. Now while the impedance of a series resonant circuit is lowest at resonance the impedance of a parallel resonant circuit is highest at resonance. The parallel impedance of the total circuit may be many thousands of megohms:—

$$Z_{\text{par}} = 6.28 \times f \times L \times Q \dots (2)$$

and the impedance actually across the crystal will be some small percentage of this due to the voltage divider effect of the two capacities in series:—

$$Z_{\text{par}} = \left\{ \frac{C1}{C1 + C2} \right\}^2 \times Z_{\text{par}} \dots (3)$$

The parallel impedance across the crystal can quite easily be 500,000 ohms or more. Thus a sharp dip will appear in the selectivity curve at the frequency of parallel resonance of the crystal. While the presence of shunt capacity causes an increase in attenuation on the high frequency side of series resonance, it also causes a corresponding reduction in attenuation on the other side.

By now arranging a capacitive bridge circuit the shunt capacity can be effectively neutralised. This is shown in Fig. 4. The balancing voltage is obtained by splitting the input circuit and coupling the out-of-phase voltage through an adjustable phasing condenser to the output of the crystal. By appropriate adjustment of this condenser the shunt capacity of the crystal is phased out and its effect eliminated. If the input circuit is centre-tapped C5 will equal C2 for balance. Now if C5, which should be, say 10 mmfd., to balance out C2, is only 9 mmfd., this is equivalent to having 1 mmfd. still in shunt with the crystal. This will mean that the frequency of parallel resonance will now be further away from the crystal frequency due to the capacity which is in series with the crystal resonant circuit being much smaller. If C5 is increased to 11 mmfd. this results in a residual inductance in shunt with the crystal. This gives an equivalent circuit shown in Fig. 5 and the parallel resonant frequency is now lower than the crystal frequency.

This effect can be explained by representing the 10 mmfd. capacity C2 as an 11 mmfd. capacity in parallel with a 1 mH. inductance. The inductive reactance cancels out portion of the capacitive reactance giving the resultant 10 mmfd. The 11 mmfd. capacity is phased out with the phasing condenser so that the 1 mH. inductance is left in shunt with the crystal.

So by adjusting the phasing condenser on each side of the balance point, it is possible to cause a rejection dip to appear on either side of the crystal frequency at the expense of loss of selectivity on the other side. It is well to note that the closer the rejection dip is required to the crystal frequency the further the phasing condenser must be adjusted away from the balance point, the limit being governed by the maximum and minimum capacity of the phasing condenser and the capacity across the crystal. Increasing C2 and C5 accordingly will enable the rejection dip to be brought closer to the crystal frequency.

C5 is usually designed to balance when set at half scale and to have an equal amount of capacity change on either side. In some cases a trimmer is connected across the condenser which is first set at half scale and then the trimmer is adjusted to give balance. The capacity of the trimmer should be kept as small as possible as it limits the amount of capacity change of the phasing condenser.

Study of Fig. 4 will show that C5 is effectively in parallel with the output coil as one side of C5 is only a few thousand ohms above ground. Thus any change in the capacity of C5 will detune the output coil which is not desirable. This is usually overcome by using a differential condenser for C5. This condenser has two sets of stator plates so arranged that the capacity of one increases as the other decreases. The other set of stator plates are earthed so that the total capacity across the output coil remains constant.

The complete filter is shown in Fig. 6. It should be remembered that the input capacity of the following tube is also across the output coil if connected right across it, and "Miller Effect" capacity changes and possible regenerative effects in the tube can upset the operation of the filter. Thus the tube must be carefully operated to prevent these effects and one effective way is to tap down the coil. When operated after a standard i.f. tube, these filters will give a stage gain of about 10 and it is good practice to reduce this gain to about unity by tapping down the output coil and operating the filter purely for that purpose and not to supply any stage gain.

ALIGNMENT PROCEDURE

This alignment procedure deals more or less with the variable sel-

ectivity filter as described above, but can be adapted to suit other types by studying the inherent circuit and applying the principles outlined. The secret in alignment of these Crystal Filters is in the use of the correct type of indicating equipment and if possible some form of vernier control of the tuning of the receiver or the test oscillator used. If not oscillator is available it will be necessary to rely on a steady carrier, preferably unmodulated. The necessity of a fine tuning is indicated by the extreme selectivity obtainable from these filters as this complicates the tuning of the signal and the indication of maximum gain.

The normal method of using a modulated signal from the test oscillator is not satisfactory as the selectivity is quite often sufficient to completely remove the modulation from the carrier on resonance and so resonance does not give maximum output.

The indicating device used must therefore be capable of indicating carrier level and not audio level. This can be an S Meter—the most convenient type of indicating device—a microammeter in the detector diode load, a magic-eye or some other form of carrier level indicator that would suit the individual receiver and operator.

Some form of fine tuning on either the receiver or test oscillator is also very desirable. Electrical bandspread will greatly facilitate this and if the receiver can be arranged to cover the broadcast, band one very satisfactory method is to feed the test oscillator into the mixer tube at about 600 Kc. and then if the band spread condenser is about 15 mmfd., this will enable an exceedingly fine tuning control of the frequency. The test oscillator can be left fixed and all the tuning done with the receiver. In a set-up used like this, λ of dial travel was equivalent to 150 cycles per second change in frequency. When it is remembered that bandwidths of 100 cycles or less are easily obtainable, some form of fine tuning is desirable. It should be realised also that any receiver which incorporates a Crystal Filter should have an exceptionally good tuning mechanism and excellent frequency stability.

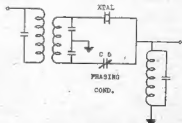


Fig 4—Crystal Filter Circuit, showing Method of Phasing Out Shunt Capacity

The actual procedure of alignment for a Crystal Filter now becomes—

1. Switch Filter to **Minimum Bandwidth** (sharpest position).

2. Adjust the test oscillator or tuning device for indication on carrier meter. This should show a peak of an exceedingly sharp nature with possibly a rejection dip and another smaller peak fairly close. Note the frequency of maximum signal, this corresponds to the crystal frequency and is usually characterised by the typical crystal "ring."

3. Detune about 5 Kc. to one side of this frequency.

4. Adjust the **Phasing Control** for a rejection dip, increasing the oscillator input if necessary. If the Phasing Condenser has a trimmer across it, it may be necessary to adjust this trimmer to bring the rejection dip within the range of the Phasing Control. Note the position of the rejection dip on the Phasing Control.

5. Detune 5 Kc. on the other side of the crystal frequency.

6. Adjust the **Phasing Control** for another rejection dip. Note the position of this dip also.

7. The correct **Phasing Control** position should be approximately half way between these two points. This position should correspond to the centre position of the Phasing Condenser and if a long way out, due adjustment should be made to the capacity range of this condenser to bring it correct.

8. If there is a trimmer across the Phasing Condenser this should be adjusted to bring the correct position to the centre of the Phasing Control.

9. Retune for maximum indication as in 2.

10. Switch **Crystal Out**. This is very important at this stage.

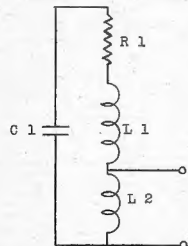


Fig 5—Equivalent Electrical Circuit, showing Parallel Resonant Effect. Phasing Condenser Too Large

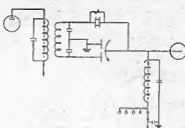


Fig 6—Complete Crystal Filter

11. Adjust all tuning circuits in the i.f. channel for maximum signal, including the **Crystal Input Coil** but excluding the **Crystal Output Coil**. The frequency which gives maximum signal with the Crystal in the **minimum bandwidth** position should also give maximum signal in the **Crystal Out** position. Any discrepancies will indicate either faulty alignment of the i.f. channel, unstable circuit arrangement or unsatisfactory i.f. transformers. This adjustment should be carried out at the weakest signal level possible in case the i.f.s. are susceptible to "Miller Effect" detuning.

12. Switch the Crystal to **Maximum bandwidth** (broadest position Crystal In).

13. Tune in a station preferably a broadcast station with music modulation.

14. Adjust the **Crystal Output Coil** for minimum distortion and minimum side-band cutting. This is due to the correct adjustment of this coil giving maximum bandwidth and so maximum high note response. Adjustment of this coil should have practically no effect on the carrier level. Any marked change in this level will indicate incorrect tuning of the signal and/or incorrect adjustment of the Phasing Condenser. Retune with the Crystal in the **minimum bandwidth** position and then switch to the **maximum bandwidth** position and recheck the adjustment of the **Crystal Output Coil**.

15. Switch Crystal to **minimum bandwidth**.

16. Tune for maximum signal as in 2.

17. Switch Crystal to **maximum bandwidth Crystal In**.

18. If it is necessary to retune for maximum signal level the **Crystal Output Coil** is not adjusted quite correctly and slight alteration to this will enable the point of maximum signal in the maximum bandwidth position to correspond with the point of maximum signal in the minimum bandwidth position.

19. Switch Crystal to **minimum bandwidth**.

20. If the b.f.o. is now switched on

it should beat with the receiver noise—do not feed in any signal—and adjustment of the b.f.o. **Note Control** should give a zero beat with this noise. Adjust the b.f.o. until this zero beat comes in centre of the b.f.o. **Note Control**. Adjustment of the **Phasing Control** on either side of the correct phasing position should cause a rise in noise level; the point of minimum noise corresponding to the correct position.

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A WIDE RANGE CRYSTAL FILTER FOR 455 Kc.

By J. BROWN, VK7BJ*

In these days of congested bands an efficient Crystal Filter is a vital necessity if QRM is not to spoil the majority of QSOs. The Filter to be described has adjustable rejector control which will eliminate a heterodyne too close for the selectivity of the filter to reduce, and a variable selectivity control.

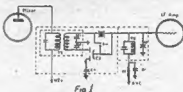
In the sharp position the selectivity is truly single signal and will remove the modulation from a phone signal. In the broad position the selectivity, whilst still much sharper than the conventional three i.f. transformer arrangement, is wide enough to allow good speech intelligibility and cleans up phone reception considerably. Thus there is no need to switch the filter out of circuit and it may be left in all the time, although provision has been made for switching it out, if desired. Listening tests on 14 Mc. c.w. prove that a signal which cannot be identified in the mess may be Q5 with the filter in.

As the filter causes a fair loss of gain it is more suitable for those receivers having an r.f. and two i.f. stages, but is also useful on smaller receivers, as an R5 signal with little QRM is more readable than a R9 one buried in QRM from other R9 stations. The crystal frequency chosen was 455 Kc., as filters at this frequency are much simpler to get going than they would be at 1900 Kc. As I prefer a 1900 Kc. channel, to avoid images and pulling, the particular set that this filter was used in is a double conversion job but this does not effect the filter operation in any way.

CIRCUIT DETAILS—ELECTRICAL

The circuit is as shown in Fig. 1. As some of the parts were not readily available they had to be made up and these will be described as we go along. Firstly, the input transformer T1 has a conventional tuned primary but a low impedance untuned secondary. This transformer is made by cutting a conventional i.f. transformer in two halves close to the bottom winding which is then removed complete and placed to one side for use as T2. Then a winding of about a 100 turns (not critical) is wound underneath the top half of the original transformer and spaced an 1" from it. The coil should be wound between two insulating washers, the wire gauge (about 30 S.E.) and width of winding should be chosen so that the new secondary coil

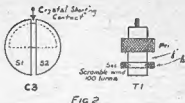
has a diameter approximately equal to the primary coil. An i.f. transformer should be chosen in which the iron trimming slug does not project below the top winding when aligned to 455 Kc. The addition of the two 100 mmfd. condensers C1 and C2, which should be small enough to be mounted inside the can, completes the assembly of T1. These two condensers are merely to provide a centre tapped output to enable the phasing condenser to work



- T1—Input transformer, see text.
T2—Output transformer, see text.
C1, C2, C4—100 mmfd. mica.
C3—Differential phasing condenser, 30 x 80 mmfd., see text.
C5—Selectivity control, 25 mmfd. midgey variable.
Sw.—Shorting contact on C3 or separate switch.
Xtal.—455 Kc. crystal.

and should not resonate the secondary to 455 Kc.

From the input transformer we pass on to the crystal phasing circuit. Owing to the fact that the crystal, plus holder, possesses a fair amount of capacity at off resonant frequencies (15 mmfd. in this case), considerable transfer of signal would occur which would mask the selectivity effect of the crystal. To compensate for this we use a neutralizing or phasing condenser C3 which feeds another voltage 180° out of phase into the output circuit. When the capacity of this condenser is equal to that of the crystal no transfer, other than that due to the resonant effect of the crystal, will



occur. By slightly unbalancing this phasing circuit an interfering heterodyne may be greatly weakened but, for tuning, the condenser should be set to the balanced position. If the circuit is traced back it will be seen that C3 in series with C2 is across the output transformer T2 and thus variation of C3 would detune this circuit, which is undesirable. To avoid this a differential condenser must be used as shown. This provides another circuit via the second half of C3 to earth via a 100 mmfd. condenser C4. C3 is so arranged that when top half is increasing in capacity, the bottom half is decreasing and vice versa. Therefore the total capacity across T2 will not change and no detuning will occur. C4 is not entirely essential and may be omitted, the second set of fixed plates for C3 then going directly to earth.

Again, a differential phasing condenser was not available but they are easily made. The total capacity required is about 30 mmfd. with three fixed plates in each section and four common movable plates. An ordinary seven plate midgey of the old Radiokets type was obtained. The insulating front plate was replaced by a larger piece of bakelite and the condenser re-assembled with another set of three fixed plates added as shown in Fig. 2.

To allow the crystal filter to be switched out, a separate switch across the crystal may be used or else an auxiliary contact mounted on the condenser frame so that it wipes on the moving plates when the phasing section of C3 has reached minimum capacity. The stunt of bending a plate of the phasing condenser so that the condenser itself will be shorted is not suitable. The crystal itself, if not purchased ready mounted, should be mounted in a holder with an air gap of about 0.001". This holder is easily made from a piece of hard rubber, which is ground to the required thickness on a sheet of emery paper and has screws to each face a plate of brass which has been ground flat on the inside. The brass plates form the electrodes. The air gap can be varied by altering the thickness of the piece of hard rubber.

The output transformer T2 is simply the second half of the original input transformer and needs no al-

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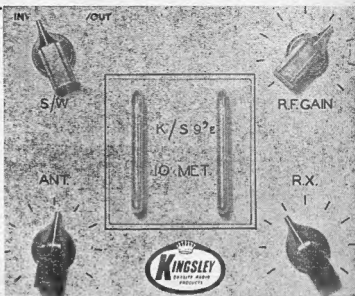
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teration other than a suitable mounting. The condenser C5, which is approximately 25 mmfd., serves as the selectivity control. When the output circuit is tuned to resonance it puts a large resistance in series with the crystal and so variations in crystal impedance do not have much effect on the voltage developed across T2 and the selectivity will be in its broadest position. When the output circuit is fully detuned it presents a low impedance and the variations in impedance of the crystal become very important and the circuit is now highly selective, intermediate degrees of detuning will give intermediate degrees of selectivity.

As the output circuit is detuned, the loss of the filter decreases at first and so the output of the set increases with increasing selectivity. However, for high degrees of selectivity, output will drop off slightly but does not drop below the crystal off position. It can be seen now why it was important that the phasing control should not effect the tuning of T2 as this would mean that altering the phasing would alter the selectivity. This type of circuit has a much wider variation in selectivity than the type which depends on detuning the input circuit.

MECHANICAL DETAILS

The most important thing to watch is that the output circuit should be shielded from any earlier portion of the circuit as any extra signal transfer would nullify the action of the

crystal filter. A shield to cut out the most likely source of stray coupling is shown in the diagram.

The best form of construction if a new set is being built, or sufficient space is available on an old one, is to build the whole filter up in one shield can, which would then simply replace an i.f. transformer. The can should be divided into two by a horizontal shield. The bottom portion should contain the input transformer, which should be individually shielded as well, the crystal and the phasing condenser. The top portion contains the output winding which need not be individually shielded and the selectivity control. The complete unit is mounted in the most convenient position and the control shafts extended to the front panel.

If this form of construction is not possible, the components can be arranged snugly on the chassis in the most convenient positions, but much more care must be taken to shield the output portion of the filter from the input circuit, and the output winding and selectivity control must be shielded. However the arrangement can be fully successful if care is taken in placement and screening. It is best for the input transformer phasing condenser and crystal to be mounted in one spot, but the output transformer and selectivity control may be mounted where most convenient and the connections made with shielded wire, as the capacity (up to a reasonable limit) can be

absorbed by the output circuit tuning. In both cases remember that the shaft of the phasing control is not at earth potential and insulating couplings and mountings must be used.

ADJUSTMENT

Tune in a steady signal with the crystal in and adjust the trimmer on T1 for maximum output. Align all other circuits, with the exception of T2, for maximum output. Tune in now to a spot where no signal but plenty of hash is being received and adjust the phasing condenser. When phasing is correct there will be a sharp drop in noise and the remaining noise will be low pitched. This is the setting for correct neutralisation. Mark this position for future reference.

With the circuit properly phased, now set the selectivity control at nearly minimum capacity and mark this for low selectivity. Now adjust the trimmer of T2 until the noise is at its loudest and is high pitched in character. If the selectivity control is now advanced the noise should be greatly reduced and become drummy in character. If the b.f.o. is switched on a ringing sound, due to shock excitation of the crystal, should be apparent, indicating a high degree of selectivity. If the trimmer of T2 has not sufficient adjustment to reach the broadest position, first of all try to reduce the stray capacities across T2 and, if this does not cure it, take some of the turns off the T2 winding.

A good check on stray coupling, which also serves to check the phasing action, is to plug a fixed condenser of 10-15 mmfd. in, in place of the crystal. On adjusting the phasing control a spot should be found where signals completely disappear. If only a dip in signal strength and not a complete cut out is obtained, then stray coupling is taking place and must be eliminated before correct operation of the filter may be expected. If no position is found where a dip occurs, then something is wrong in the phasing circuit. If the directions have been faithfully carried out, this will be extremely unlikely, but check it over just to make sure. A large amount of stray coupling could also cause this trouble and, with a sensitive receiver, it is surprising how little stray coupling will cause a large signal leakage.

Owing to its high selectivity, the crystal filter greatly reduces all noises of the continuous type and the signal stands out of a quiet background, thus then signal/noise ratio is greatly increased. This effect often makes the user think the gain of the set is greatly reduced as the selectivity is increased, but it is the noise only which is reduced and not the signal.

On the other hand impulse noise, such as ignition, is reduced, but not eliminated, and the selectivity of the filter broadens the pulses so that the common forms of noise limiter which follow the second detector are not very satisfactory. The only satisfactory way of eliminating ignition noise with a crystal filter is an i.f. silencer working before the crystal.

Some crystals have spurious responses, but with a good crystal these are unimportant. On tuning a signal in on an S meter, two peaks may sometimes be found. If the crystal is satisfactory, this indicates that the phasing condenser is not set to balance and correct setting of this condenser will eliminate it. Actually this second peak is due to the rejection effect of the out of balance crystal filter causing a wedge of no signal to be inserted in the pass band. This is the effect used for the rejection of an interfering heterodyne.

A lot of users waste so much time in adjusting their filters that the over is finished before the signal is properly tuned in. The way I have found best is to tune with the filter in and already adjusted to an approximate degree of selectivity for the conditions existing at the time, and the phasing condenser set at balance. The signal is then tuned in normally, although care must be taken not to pass over the signal when in the very sharp position. If a heterodyne is annoying it may be eliminated by slightly adjusting the phasing control. The phasing control should be restored before further tuning takes place. I find this method much better than tuning with the crystal out and then switching it in. (Continued on page 24)

Editor, Sir,

I note with interest the reference to the grounded grid amplifier in Mr. D. J. Medley's article on "V.H.F. Receiver Design," "Amateur Radio" of June, 1947.

The circuit given in this article for the grounded grid amplifier (Figure 2) has a number of features which may prove disadvantageous to an Amateur trying CV66 type valves on the 166 Mc. Amateur band.

(1) The circuit published shows one side of the heater connected directly to ground. This results in the cathode to heater capacitance of the valve being connected directly across the input circuit, which in the case of a CV66 places an unnecessary reactance in shunt. The cathode impedance (input impedance) of the grounded grid amplifier is low in any case, being approximately the reciprocal of the mutual conductance, but the reactance of the cathode heater capacitance will be low as well at 166 Mc. The serious effect of partial breakdown between heater is also obvious.

These troubles can be largely avoided by the insertion of chokes in each heater lead. This places a high impedance in series with the heater cathode capacity.

(2) The amplification obtainable from the stage is a function of the effective impedance in the plate circuit. Other things being equal the higher this amplification the better is the signal to noise ratio or noise factor ultimately obtainable. Thus for the best noise factor it is necessary to make the load impedance presented to the plate by the input circuit of the following stage the optimum value. Furthermore losses in the interstage coupling circuit must be as low as possible.

The circuit given by Mr. Medley shows a double tuned interstage coupling. This type of coupling is particularly unsuitable. It is difficult to adjust the transformation ratio and will have roughly twice the losses of a simpler tuned transformer.

Using the CV66 on 166 Mc. it will be found that the output capacity is so high as to virtually prohibit the use of additional shunt capacity for tuning purposes. Series tuning of the plate circuit is therefore indicated, provided steps are taken to ensure the correct matching between plate circuit and the following input circuit.

(3) The input circuit of the grounded grid amplifier requires special consideration. The circuit published by Mr. Medley shows the cathode virtually coupled directly to the cathode with a tuned circuit tapped directly onto this line. There is an

optimum transformation ratio from the aerial impedance to the input impedance of the grounded grid amplifier, for best noise factor, and in general this will not be unity. Furthermore it is difficult to adjust the parallel tuned circuit he uses and keep the losses in this circuit low.

This is due to the low impedance which damps the circuit, and makes tuning difficult if the cathode is tapped too far up the coil. The tuning can be sharpened by moving the tap down the coil as shown in his circuit but this greatly increases the losses and consequently the noise factor.

This would appear to be a suitable application of a broadly tuned series circuit again.

Finally I would like to emphasise the benefit to be obtained on 166 Mc. from the adequate use of the grounded grid amplifier. An improvement of 6 db can be obtained using two CV66 amplifiers compared with acorn or miniature pentodes. This corresponds to a noise factor of 5 or 6 db above thermal limit. In terms of radiated power this is a factor of four times improvement.

It is important to note that the sensitivity of a receiver on short waves is limited mainly by atmospherics and by man made noise, not by the noise generated in the aerial and in the first amplifier stage by thermal agitation. This means that practically any sort of valve can be used on short waves to realise the ultimate in receiver sensitivity. This is not the case on the ultra short waves, and receiver performance is set by thermal noise in the aerial and the effectiveness of the receiver in being noise free.

Yours faithfully,

ROSS F. TREHARNE
(VK2IQ)

(Mr. Medley points out that the above comments are quite in order in as much as they apply to the 166 Mc. band. The article, however, was written for the 50 Mc. band where these faults would not be so serious. The points raised by Mr. Treharne were referred to in the lecture from which the article was taken, but unfortunately missed publication—Technical Editor.)

A letter has been received, signed by a number of South Australian Amateurs, suggesting a Contest for 166 Mc. together with suggested rules for the running thereof.

This letter has been passed on to Federal Executive who will no doubt take some action on the matter.—Editor.

FIFTY AND UP

VK CONTACTS KH6

Attention, gentlemen, for C. H. Castle (VK5KL), who worked W7ACS/KH6 on 26th August, 1947. The following is his account of the contact. *

DX on 50 Mc. is not a dream any longer, but like one of Jules Verne's creations, has come true. In all my 14 years of Amateur Radio nothing has thrilled me so much, not even that first QSO or working an elusive South American. Ever since 1934 when I first QSO'd VK5IT on the old 50 Mc. band using a battery operated super-regen. receiver and a ultra-audio circuit transmitter, I have dreamed, planned and strived for better equipment and more co-operation to popularise the band.

The war years intervening, then 1946 and back on the air. Allotted 50-54 Mc. and a real chance now of DX as 50 Mc. comes well within reach of M.U.F. prediction when high enough. Improved technique, super-het receivers, crystal controlled transmitters and multi-element beams all in the right trend to bring that dream true.

All set to go, when I was transferred to Darwin in my occupation. What hope now with nearest Ham on 50 Mc. at Katherine, 160 miles away

by air. Still, the mind persisted and a converter built to live up the front end of the communications receiver. A transmitter followed and finally a three element beam.

December, 1946. The band looked like opening up. Interstate DX was achieved. Honors to VK2NO and VK3MJ. Unfortunately I was not to participate in any of it. Rushed to Melbourne for an operation and by the time I returned and sorted out the gear, the DX season had more or less passed.

Encouraged on by activity in Honolulu, Japan, Okinawa, Singapore and India, the chance of real DX might be achieved yet. Close study of M.U.F. prediction charts and ionospheric predictions issued from Mt. Stromlo followed. Each month when severe disturbances were reported a close watch has been kept on the band.

On 22nd August a severe disturbance took place and the usual watch was kept when at home, mainly around noon. Skeds were also being kept with VK5NR and VK3BQ. Arriving home at 1200 hours on 26th August, the beam was swung in the direction of VK3, a signal was heard weakly and fading rapidly, and on identification it was W7ACS/KH6,

Pearl Harbour, calling "CQ Six." The surprise and thrill of hearing a signal at last, and what's more an international signal, with the possibility of it, if contacted, setting a record, brought on reaction in the form of severe shaking from head to foot, and panic to get the beam around and lined up on him.

Rushing outside to manipulate the ropes on the beam I became entangled amongst them in my haste. Returning inside and frantic calling, though almost unable to hold the microphone and speak at the same time, I get no reply. At 1215 hours W7ACS/KH6 called CQ, R5 and S5 now. I call on 51.6 and 50.025 Mc. with no result. At 1230 while W7ACS/KH6 is calling CQ I peak the beam on his signal and call again. The perspiration stands out on my forehead as he answers QRZ? Again I call, long and loud. All at fever pitch now for the reply. Time was 1240 and the greatest moment in my life passes as W7ACS/KH6 answers calling VK5KL Darwin and saying Well! Well! this is one for the books and offering congratulations.

His signal was S7 now and gave me S3. We continue for several overs describing each others gear and arranging sked for 1200 CST each day. W7ACS/KH6 was now S8 and a beautiful signal, as VK5SA can vouch



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for because he lives next door and came in to witness the closing covers. The contact lasted for 10 minutes and closed with both of us looking for any other stations. I relaxed with radiant joy as I realised that I may have that coveted honour of being the first VK to work outside Australia on 50 Mc.

DX on 50 Mc? Yes it is an accomplished fact and no telling what the next six months will bring as the M.U.F. rises. W.A.C. maybe. Who knows. Time will tell.

We wish to point out that, up to the time of going to press, no official confirmation of above contact has been received.

VK3 FIELD DAY

On the pleasant, but cloudy, afternoon of 7th September, a Field Day was held in VK3 (maybe in other States also, but no notes to hand, save VK4s). The portable stations in VK3 were 3AB, 3YS, 3RR, 3KA, 3UI-3BG, 3MB, 3HK-3YJ, and 3ABU.

3ABA and 3YS could not go to Mt. Tarrangower as planned, but worked from a spot 600 feet high north of Warrandyte (23 miles N.E. of Melbourne). Fred and Jim used their c.c. portable with 832 in the final and 3 watts input. 50 Mc. received was 1892 and 676 into Type 108 and half wave horizontal antenna. On 166 Mc. the 832 was used as a tripler with output of 1 watt. Antenna was half wave vertical; receiver a super-regen. Stations worked were all on 50 Mc., being VKs 3ADF, 3MJ, 3HT, 3PG, 3BD, 3HK, 3DA. Heard 3RR, 3BW, 3CP, 3MN, 3RO, 3VL. No contacts on 166 Mc. due to low power possibly but heard 3EM, 3AKI, 3MN all S8.

3UI (with 3GD and 3TS) went to 3ABG's, thence to a 1600 feet high hill, 12 miles east of Avenel (70 m. N.W. of Melbourne). The two separate rigs were set up 20 yards apart. 3ABG used 12 watts to 807 class B linear amp, and 3UI used 15 watts from generator and receiver off vibrator. 3UI used half wave horizontal 20 feet high. Both 3UI and 3ABG worked 3HT who passed the news around to the Melbourne stations without resulting in any more contacts. 3HT was S6 and gave 3UI S5 and 3ABG S3. Stations heard were 3ADF S3, 3RR S5, 3CS S3. At 1230 3ADF was S3, at 1831 was S4 and at 1721 S8.

3MB was at Arthur's Seat, 38 miles south of Melbourne. On 166 Mc. Ron used p.p. CV8s mod. osc., modulated by 6K6C. Receiver was 955 into a 6K6, and antenna was a 3 element rotary beam. The following were worked at good strength both ways 3RR, 3MN, 3AKI, 3ACM, 3LS, 3EM and 3EO. 3TZ and 3MB heard each other but did not contact due to "flat" battery (moral, carry spare battery).

3KA and 3RR were at Macrae, 36 miles south of Melbourne. Gear used on 166 Mc., 3RR Tx 6V8 c.o., 6V6 tripler, 6V6 doubler, 6J6 (each section as separate doubler), 832 final

with 30 watts. On 50 Mc. same set up but omitting 6J6. Receiver on 166 Mc. was 3RR's modified ASV 11 tube superhet; 50 Mc. receiver of 3XA used 6AG5, 6AG5, 6C4 into 5 tube d.w. mantel set. 166 Mc. antenna was 3XA's beam 20 feet high; 50 Mc. used half wave horizontal. On 50 Mc. they worked 3HT, 3MJ, 3BD, 3BQ 3AN, 3HK (S9), 3ABU (S5), 3RO, 3CP, 3ZL and 3GM (at Ballarat, 82 miles airline), and 3KX (at Colac 72 miles S7). On 166 Mc. 3MN, 3LS, 3AKI, 3MB, 3EM and 3ACM were worked.

3HK and 3YJ were at Mt. Dandenong, 22 miles east of Melbourne. Equipment was probably 3HK's c.c. portable with 807 and 5 watts, and receiver a converter into a FS6. As neither Jeff or Keith sent any notes I cannot give any further details.

FIELD NOTES FROM VK4

Unfortunately for VK4s the 7th September was a wet, very wet day in south east Queensland. Definitely the worst day possible for a field day. Nevertheless 4ES, 4CU and 4LN operated portable from various mountains within a 50-100 mile radius of Brisbane. Owing to the inclement weather, operations were confined to 50 Mc., and the test proved perfectly satisfactory as far as local contacts went, the only possible DX heard was someone on m.c.w. who called 4ES on Mt. Glorious. Your narrator had the doubtful privilege of blotting him out. We would very much like to identify this station, so QRZ, please speak up.

The co-operation of 4LN, 4CU, 4AF and 4SN and others on field days is much appreciated by the local gang and the warmer weather should yield some outstanding results on similar events.

50 Mc. JOTTINGS

VK3MJ has departed to the land of DX, heat, wogs, etc., Darwin to wit. Is now active with the call sign VK5AE. Good luck, Dave.

VK4LN's antenna on 50 Mc. is 110 feet high. How do you de-ice it Barrie?

The VK4 gang are going in for power increases in quite a big way. 4HR is threatening to run 80 watts. 4FB has stepped up the herbs, and 4RY has also turned up the wick and added a new modulator. A vastly improved signal on 50 Mc. is that of 4YJ.

August 15-17 saw VK6SA out again, this time off Garden Island and Rockingham. Excellent signals the whole of the time from Jim's i.b. portable.

Usual weekly activities in VK8 are proceeding well, including tests with f.m., but there's plenty of room in the band for others.

VK6FB (Mullewa) has completed new exciter and VK6WZ (Gerah-ton) is ready with new converter to carry out listening tests as soon as 6FB's final is finished. Hope to be able to announce Frank's sked times in next issue, so we can try the 300 miles between Perth and Mullewa.

The N.S.W. V.H.F. Section held a Field Day on Sunday, 7th September, also, in which the 166 Mc. gang had some great fun, and did some good work. Nearly everyone managed to work each other, with the exception of VK2PW who was operating from a raised spot at Kiama on the South Coast. His two contacts were both in the record breaking class—the first with VK2AHG at Kurrajong, a distance of about 80 miles airline, and with VK2ABB in Sydney, the latter

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being a particularly interesting contact.

Stations 2KI at Mt. McAllister, Goulburn, 2YE at Hornsby, and 2ADY at Cowan Heights were also on the road, and had many contacts. So many stations are now on the band that it looks as though crystal control will be needed to prevent chaos when everyone starts up at once. Most of the stations are now using beam aerials.

"166 AND ALL THAT"

Acute shortage of Interstate notes, save VK4, is this band. In VK3 activity is very quiet, save on field days. The boys either seem to be away or busy building, etc. 3ACM has his modified ASV super going well and is very pleased with it. 3IV has got interested on 166 Mc. and expects to have a rig mounted on a pole right up to the antenna.

3ACM, to get band spread on his ASV receiver, used smaller osc. inductance and more lumped capacity, this helped stability also.

Signals on 166 Mc. appeared to decrease in strength from 12 noon to dusk on the Field Day when it was noticed that VK3RR (Macrae) faded to a strength that he could not be worked. The signal strength increased after dusk to a value not quite as great as at 12 noon.

Stations active on this band in Brisbane are 4ES, 4FB, 4HR, 4JY, 4KB, 4XG and 4TR, although the last named has been in a spot of bother with long lines. We spoke last month of 4HR's 522 and feel obliged to mention that Tibby found it preferable to fit individual oscillators for both 50 and 166 Mc. reception. Otherwise the job is as mentioned in the September "A.R."

4XG built up the 166 Mc. rig described in the Handbook, but could not get satisfactory operation of the 6C4 buffer and found that results using a 8003 in that position were quite impressive. The rig referred to is the 6C4, 6C4, 815.

"1,400 Mc. OR BUST"

3VM has tried a double cavity oscillator using a 2C40, and feeding into a dipole with a parabolic reflector. (I would love to tell you what he used for a reflector but can't, it came out of his XYL's frigidaire.) He used a dipole and crystal detector and microammeter for making some field strength tests. Complains that 1,400 Mc. is too low for effective work.

Another VK3 has bought three GL446Bs, one to use and two as replacements. It is said that "light houses" go into cavity resonators OK, but come out in pieces.

UP WITH THE ANGELS—

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As 3VM considers 1,400 Mc. too low, he will be establishing a circuit with 3DH on 10,000 Mc. in a month or so, when the necessary gear arrives. Will all good Hams say a prayer for the boys at Mont Park checking station?

FEDERAL QSL BUREAU

RAY JONES, VK3RJ, MANAGER

Stations in VK9 are again reminded that incoming cards can be obtained from VK9GW, Mr. G. Warner, c/o. O.T.C., Port Moresby, by the usual stamped addressed envelope method.

The QTH of VK9BI is now: Arnel Wilkey, c/o D.C.A. Finshhafen, T.N.G.

The Russian Arctic Expedition whose station signs RAEM/MM can be heard on 14,035 Kc. with a drifting T3 note, around 0530 E.S.T.

Further to paragraphs in these notes some months back regarding QSLs to PK6HA. The backwash is now to hand. A few VK stations now claim that the boot is on 't'other foot and that cards from PK6HA are still outstanding. The next move is yours L.H. Hagers. Among those awaiting your card is VK7JH.

To the moment of writing the long awaited second list of call signs and addresses of Australian experimental stations, is still not to hand. The publication was expected to be available during 2nd week in August. Apparently it will again be a little out of date when issued, but the quarterly supplements should catch up on the leeway.

An interesting write up of the gear and work done by VK3GE at Balcombe appeared in a July issue of the Mornington Post, together with an excellent picture of the owner, Lt.-Col. George Every, and the set up. Glad to see you looking so well George and congrats on the outfit.

The Victorian QSL Manager, Graham Roper, 26 Lucas Street, Caulfield, S.E.8, is waging an uphill fight, what with the absence of an up-to-date VK call list and the reluctance of addressees to claim their cards. The list below shows those unclaimed to September 3. Anyone mentioned therein is urgently requested to do the right thing and make arrangements for the collection of their cards. After 1st November all unclaimed cards appearing in this list will meet the fate they deserve. If any country call signs are included in the list, the owners are requested to contact VK3ZB, as he has no means of knowing who is who among the stations licenced during the past 12 months.

VK3s: ACF, ACG, ACM, ACX, AES, AFD, AFG, AGE, AGJ, AHK, AHM, AHR, AIG, AIL, AJB (ex-VK7JB), AIX, AJY, AKI, AKM, ALR, ALS, AN, AO, AOZ, APK, ARD, ARH, ART, AS, AT, ATH, ATR, BG, BK, BP, BS, CM, CU, CX, DA, DD, DG, DH, DS, DZ, EJ, ES, EW, EX, FG, FF, FO, FW, FX, GB, GC, GF, GG, GK, GR; GT, HC, HD, HJ, HP, IU, IW, JG, JH, JP, JR, JS, JW, JZ, KD, KI, KO, KT, KU, KV, KW, KY, LB, LC, LD, LG, LJ, LF, LR, LY, LW, LZ, MD, MP, MR, MS, MW, MX,

SUCH NICE PEOPLE

By "GREMLIN"

To 3CN and 3TM, greetings. Yep, I too have a soft spot in my heart for the proficient c.w. chappie. Usually his fone work is equally good. I agree with the Federal Executive policy of reducing restrictive regulations to a minimum, but I do think every Ham should aim at becoming proficient in all phases of operating and it should be the policy of the W.I.A. to foster that aim. I don't agree with the many who say c.w. is an unnecessary evil and about as useful as a boil on the saddle contact of a boundary rider. Who gets the most out of Amateur Radio? Barring the disposal points, I say the 25 w.p.m. boy. Try it and see!

Anybody wanting a wrecked car fixed, or a fixed car wrecked, see 3XC. I reckon quite a few got some chuckles from your hair-raising narrative on 7 Mc. recently, Willy. The new CQ champ, 3LV, decrowned Cobber Alf with 34 straight and mournful ones. Don't worry Alf, the title still belongs to VK3.

Afraid the grudges are few this month. Truth is I've been busy doing nothing. Only the XYL knows how busy that can keep me. Been propping the old plates on the mantle most nights and delving into forms to see what makes pulses and other strange devices tick. Plenty of interesting dope available on frequency modulation, but what every young Ham should know about Pulse Transmission is more elusive. Mr. W.R.G. I'm starving and that food for thought in regard to Pulse Technique is eagerly awaited. Big helpings please.

3LJ the worst splashing offender I heard this month. 4JP, 2FJ and 3GN to a lesser degree. Pretty hefty hum on 3MS phone. 2ARE, 2BC, 2ALG, 3EG and 3TK noticed with clicks, 3ZW and 3QS with chirps and 2ML with a rough note. 2FA operating on 14 Mc. has a fair harmonic on 28 Mc. Your voice tricked me a couple of times Don, thought you were DX.

Before I forget, the bloke who sets up print, or whatever they do, had the wrong idea last month. My rig is haywire, not Amateur Radio. Of course if all rigs are like mine, last month's version stands! By the way, 3FP may have some sound ideas on screen modulating an 813.

NA, NB, NG, NW, OU, OZ, PA, PB, PE, PH, PI, PK, PZ, QB, QC, QG, QL, QN, QQ, RF, RI, RK, RT, RV, RW, TD, TO, TR, TY, TZ, UD, UF, UO, UP, UQ, VA, VB, VE, VF, VM, VN, VY, WL, WN, WR, WX, WZ, XA, XG, XJ, XN, XS, YF, YG, YH, YK, ZH, ZY, and ZV.



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LTD., 53 Cameron Street,
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FEDERAL NOTES

The Federal Executive desires to place on record the excellent services rendered by Mr. R. H. Cunningham (VK3ML) who through the pressure of business, has tendered his resignation as Contest Manager.

You are all fully acquainted with the able and efficient manner in which the contests have been conducted over the many years that he has occupied the office of Contest

It is with great pride and very many thanks that the Federal Executive announce the donation of an Eddystone Model 640 receiver by Messrs. Stratton & Co. Pty. Ltd., of London, for the official use of the Federal Station VK3WIA. This receiver is en route to Melbourne and when received will no doubt be put to very great use in the operation of VK3WIA.

Manager and it is with great reluctance that the Federal Executive has accepted his resignation.

In making the appointment of Mr. E. H. Jenkins (VK3QK) as the new Contest Manager, Federal Executive feel confident that the same high standard set by Bob Cunningham will be maintained. With a programme of four contests being conducted annually, namely VK International in October, National Field Day in January, Trans-Tasman in May, and Remembrance Day Contest in August, it will be readily appreciated that the need for an assistant is very important and in this connection Mr. L. S. Dixon (VK3TE) has offered his services and has been duly appointed as Assistant Contest Manager.

To most members the efforts of the Federal Secretary are comparatively unknown, but to the Federal Council and Executive they are very well known and greatly appreciated and with the resignation of Alex H. Clyne (VK3VK) another very capable administrator has been lost from the Federal sphere. Alec's resignation has been due to pressure of personal business and it is again desired to record the excellent services that he has rendered during the past two years as Federal Secretary.

Federal Executive desires to thank all of the above members for the efforts and the hope that the retiring ones will not lose an active interest in the Amateur movement.

REGULATIONS AMENDED

The P.M.G. Department has notified all Amateurs of the following amendments to the Wireless Telegraphy Regulations:—

"Experimental Station Licences" will be officially designated "Amateur Station Licences" and their Stations will be referred to as "Amateur Stations."

Only one class of licence will be issued instead of two as formerly. Irrespective of the class of licence and certificate now held, power not exceeding 100 watts may now be used by all licences. It will be unnecessary for the existing Class "B" licences to be amended in this regard.

Only one class of Certificate will be issued instead of two as formerly. It will be known as the "Amateur Operator's Certificate of Proficiency." No amendment to the existing Certificates will be necessary.

NEW HANDBOOK

Last month we asked for suggestions and comments on the material

which you think should be included in the new companion publication to the Postmaster General's Department Handbook, up to the time of writing these notes no suggestions, etc., have been received so what about getting those thinking caps on and letting the Federal Secretary have whatever you can

RESULTS OF B.E.U. CONTEST

Message No 3 to VK3ML de G6CJ, 23/8/47:—

Senior B.E.U. 1947—188 logs:—

ZS2AL	1884 points
VQ8HJP	1850 "
ZL1BY	1225 "
VK2EO	1118 "
G5WPF	1558 "

VK2DI } 6th and 7th, equal

Junior B.E.U. 1947—66 logs:—

ZL4GA	828 points
VS9AN	732 "
ZB1AD	658 "
VK4RC	"
VK5RX	6th and 7th, equal
G8IL	469 points

Owing to complications of fuel restrictions no awards are being made in G this time.—Signed G6CJ.

W.I.A. 1947 INTERNATIONAL DX CONTEST

Prizes for the Contest to be held over the week-ends of October are as follows:—

Transmitting c.w. open.—1st, Pair 800s and pair 888As; 2nd, 6BPI and AV11 High Voltage Rectifier.

Transmitting phone open.—1st, Dynamax Microphone with a desk stand; 2nd, Type TA907 Modulation Transformer.

28 Mc.—Fone, AR301 High Frequency Receiver; C.W., "KS" 9'er (less tube).

14 Mc.—Phone, Eddystone parts to the value of £5; C.W., Transformers and Chokes to the value of £5.

7 Mc.—8" Speaker, Pair 6AC7s and one subscription to QST or CQ.

Receiving.—1st, 8" Speaker, Pair 6AC7s and one subscription to QST or CQ; 2nd, Pair 6AC7s and one subscription to QST or CQ.

A prize to the value of three guineas yet to be determined, will be awarded for the 3.5 Mc. band winners.

Where insufficient entries in one section make the granting of the prize unnecessary, that prize will be added to those in another section.

Entrants may compete, and be eligible for prizes, in any one, or all sections, provided a separate log be forwarded for each section. Contacts for one band sections may count in the open section.

Contacts with other VK districts must not be counted, and VK7 and VK9 districts must not be counted as multipliers.

As New Zealand are not associated with the W.I.A. in this Contest, contacts with ZL will be naturally counted and ZL will be a multiplier.

In addition to the prizes donated by

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ENGLISH AND AUSTRALIAN.

WIRELESS WORLD:	25/- year	WIRELESS ENGINEER:	42/- year
PRACTICAL WIRELESS	10/6 "	ELECTRONIC ENGINEERING:	33/- "
AUST. RADIO WORLD:	10/6 "	RADIO AND HOBBIES:	6/6 "
AMATEUR RADIO:	6/- "	SHORTWAVE MAGAZINE (English):	25/6 "

FOREMOST IN AUSTRALIA FOR TECHNICAL BOOKS.

our manufacturers, attractive certificates will be awarded to the section winners and also to the section winners in each state of Australia.

A special word of appreciation is given by the W.I.A. to the following manufacturers for their generous donations which will be an added incentive in the Contest:—

Trimax Transformers, Melbourne Swales & Swann, Melbourne.

Technical Book & Magazine Co., Melbourne.

Keith Harris & Co., Melbourne. Rola Co., Melbourne.

Amalgamated Wireless Valve Co., Sydney.

Stearns Sound Systems, Melb. Kingsley Radio Pty. Ltd., Melb.

Philips Electrical Industries, Syd. 18 Swan Street Pty. Ltd., Melb.

LIST OF CALL SIGNS

As announced in these columns last month the following is a list of the alterations, additions and cancellations of call signs advised by the Wireless Branch of the P.M.G.'s Department:—

New Licensees

VK2IM—V. A. Tobin, 204 Cornish St., Railway Town, Broken Hill, N.S.W.

VK2IN—J. H. Keblewhite, 41 Burns Rd., Wahroonga, N.S.W.

VK2IT—W. R. Beveridge, "Karoola," Alfred St., Mittagong, N.S.W.

Amateur Radio; October, 1947

VK2IW—F. A. BORCHARD, 538 Wolfram St., Broken Hill, N.S.W.

VK2JM—M. C. Laybutt, 3 Oxley St., Kingston, A.C.T.

VK2NT—J. W. O'Neill, 11 Highview Ave., Neutral Bay, N.S.W.

VK2TJ, J. W. Thompson, 11 Temple St., Stanmore, N.S.W.

VK3EI—S. C. Broadbent, 164 Victoria St., Ballarat, Vic.

VK3IQ—K. J. Duff, 24 Rundle St., Ararat, Vic.

VK3MF—K. M. Dobbins, 42 Walnut Ave., Mildura, Vic.

VK3NQ, F. K. Barker, 24 Northernhay St., Regent, N.19, Vic.

VK3RY—G. R. L. Hancock, 95 Charles St., Northcote, N.16, Vic.

VK3SW—J. M. McConnell, 50 Albert St., Geelong West, Vic.

VK3AIT, I. M. Templeton, Sutcliffe St., Sea Lake, Vic.

VK3ATP—C. N. Pickering, 61 Ardmillan Rd., Moonee Ponds, W.4, Vic.

VK4TW—A. W. Tarling, 22a 6th St., Townsville, Qld.

VK4UK—F. R. O'Sullivan, 68 Walker St., Bundaberg, Qld.

VK5BA—Reverend P. Smith, Box 22, Snowtown, S.A.

VK5HC—J. K. Carruthers, 21 Clifton St., Hawthorn, S.A.

VK5MS—M. S. Millowick, West Lane, Roseville, Mt. Gambier, S.A.

VK5PX—P. R. Walker, Daly St., Sth. Plympton, S.A.

VK5VO—A. W. N. Sobey, 21 Fern Ave., Fullarton, S.A.

VK5ZR—R. A. Kelton, 53 Crozier St., Mitcham Park, S.A.

VK6AE—H. A. Lee, 21 Outtrim St., West Perth, W.A.

VK6BJ—K. M. Bunn, 80 Mackie St., Victoria Park, W.A.

VK6JW—J. C. Watson, 20 Lawley Cres., Mount Lawley, W.A.

VK7EJ—E. J. Cruise, "Beaumaris," Montpelier Rd., Hobart, Tas.

VK7WG—W. G. Gough, 44a St. George's Terrace, Battery Point, Tas.

Alterations

VK2ACX—A. W. Stowar, now 12 Schackel Ave., Kingsgrove, N.S.W.

VK3AQQ is now VK2AGQ—G. E. Doughty, now 6 Carlow St., North Sydney, N.S.W.

VK3DC—D. G. Caldwell, now 83 Spray St., Edwood, S.3, Vic.

VK3PF—J. H. Lawrence, now 32 McLaughlin Ave., Sandringham, Vic.

VK4UJ—P. L. Dubois, now "Bendmere," Lower River Terrace, Sth. Brisbane, Qld.

VK4ZY—C. E. J. Burns, now 340 Sheridan St., Cairns, Qld.

VK5QI—L. E. Davies, now 18 Tyson St., Ashford, S.A.

VK6BK—R. C. Krummel, now 179 Railway Rd., Gooseberry Hill, W.A.

Cancellation

VK2YI—H. W. Blue, 55 Leura Rd., Auburn, N.S.W.

DIVISIONAL NOTES

NEW SOUTH WALES

Secretary: Peter H. Adams, VK2JX
Box 1734 G.P.O., Sydney.

Meeting Place: Science House, Gloucester and Essex Streets.

Meeting Night: Fourth Friday of each month.

The August meeting of the Division was held on 22nd August at Science House, with a particularly good attendance. The lecturer for the evening was Ray Howe (2ARH), his subject being aerials, with particular reference to matching and phasing of arrays and feed lines.

Ray supplemented his story with a few practical examples, with particular reference to co-axial cable, and the use of unbalanced feed lines to aeriels. The lively discussions which followed indicated the success of the lecturer.

The Divisional Council has completed its proposals to link up with Radio Clubs on a Member Club basis, which it is hoped will bind together all such Clubs with the Institute. It will mean, too, that Club members who are not Institute members will, through their Clubs, have a link with the Institute. The scheme will be discussed at the September general meeting. Those Clubs already consulted have expressed themselves as agreeing in principle to the proposals.

The Council also had a long session recently on the proposals for the new W.I.A. Constitution, which this Division hopes will eventually become a single document to cover the whole Institute. The Council has also commenced preliminary analysis of its own Divisional Constitution preparatory to revising it in the light of today's requirements. These two projects must of course be considered together.

Peter Adams has found the addition to his household, plus business pressure, a big handicap in handling the ever-growing secretarial work of the Division. The Council would be glad to hear from anyone who is able to take over this important job. One of the younger enthusiasts is to be preferred—the older gang are finding it harder and harder to keep the ball rolling. What about giving them a break?

At the September general meeting the V.H.F. Section will give a demonstration and lecture on the use of high frequencies. Neville Williams (2XV) has made a number of recordings on 50 Mc. and will bring them along together with his gear and accompanying story. Should be an interesting night.

VK2WI now operates on the 50 Mc. band each week with Institute news. It helps to keep V.H.F. enthusiasts in the picture, apart from recognising

the band as a logical local channel for domestic use.

N.S.W. ZONE OFFICERS

North Coast and Tablelands:—2AFP, Casino.

Newcastle and District:—2FP, Hamilton.

Coalfield and Lakes District:—2YL, Cessnock.

Western:—2QA, Nyngan.

South Coast and Tablelands:—2ANN, Bega.

Southern:—2OJ, Albury.

COALFIELDS AND LAKES ZONE

2KF, our new Ham, is using 14 Mc. phone and c.w. mainly. 2KZ is having good time with Ws on 28 Mc., aim is to W.A.S. on this band. Should have eight half waves in phase soon. 2YO heard last on 14 Mc. phone, how about ringing Cessnock 53. 2KT still on 7 Mc. and should be making noises with all the gear available. 2MK getting ready for 50 Mc., meantime is active on 28 Mc. phone. 2PZ using 7 Mc. phone at present, but building 50 Mc. super and should make the V.H.F.s. soon.

2ADT is "always doing things." Up and works 2LY (Katoomba) and 2YQ (Schofields) on 50 Mc., plus 2OC, 2BZ and 2AHA; frequency 51.17 Mc., aerial 3 element vertical rotary. 2YL playing much tennis, but has 120 post-war and is ready to go on 50 Mc. very shortly. 2OC very consistent on 50 Mc. 2AIO at the Entrance is on 14 Mc. phone. 2TK, an old timer, making a comeback on all bands. 2RU on 50 Mc. mainly, sometimes makes the 14 Mc. DX band. 2AMU will be on 50 Mc. soon. Old timers 2KR and 2GA active on 7 Mc. phone.

NEWCASTLE AND DISTRICT ZONE

2BZ is very keen on 50 Mc., spends a lot of time there with good results. 2AFS has now a 100TH in the final; it's on a holiday with only 70 watts. 2CS doing the proper thing, building all the refinements before the transmitter proper. 2AGD unfortunately lost his beam, unwound off the pipe thread, getting rebuilt to new design; watch for a big signal. 2AHA working all bands, over 100 up post-war. 2PQ has busted one rock, back with a vengeance and improved quality.

2ZC treating all bands with a fine signal. 2FP has 80 post-war countries on 28 Mc. phone and 35 watts; finds them hard now. 2TE heard early in the month on 28 Mc., hope no trouble.

SOUTH COAST AND TABLELANDS ZONE

The following comes mainly via the grapevine. 2TA, 2TC and 2PN are all active on 50 Mc., the latter with automatic keying. 2DO has a new receiver on 50 Mc. 2AKE inactive, is rebuilding.

2JQ and 2ALD, our two clerics, were heard rag-chewing on 7 Mc., middays. 2GU seems to be interested in DX again. Old timer Les Edwards, ex-2LM, hopes to make a comeback from Merimbula. 2ANN is building a plate modulator (p.p. 630B) for the 813. 2MT busy placing a crystal in the receiver.

SOUTHERN ZONE

2VK re-vamped transmitter and is mainly active on 7 Mc. 2GG moved to Sydney, let us know your QTH Jim. 2QD back in civvy life again, to be heard shortly. 2EU has the worries of home building, using temporary shack and aerial. 2APW pleased with frequency meter. Is active on 7 and 14 Mc. 2JA not heard yet, illness prevented activity, hope OK now. 2AIB recently heard on 7 Mc. phone and c.w. 2BC (ex-Alburyite 2WB) spent holidays here. 2OJ waiting for a fine week-end to complete out-door jobs.

WESTERN ZONE

2BT has new AMR300 receiver and finds it helps with the DX. 2WH erecting V beams, results so far are patchy. 2II rebuilt r.f. section of receiver, also using co-ax. 2AMR exclusively on 14 Mc. with co-ax fed doubler. 2ACT on 7 Mc., still interested in disposal gear. 2NS rebuilding entire shack, heard using voice controlled transmitter. 2TG is still after new countries on 14 Mc. c.w.

2ALX uses a AT20 with nice phone. 2ACU QRL, only using a Type 3 2HZ still building receiver. 2QA contemplating many changes with the change of QTH. 2LJ still on the highs, somebody mentioned a comeback on 7 Mc. 2KI, 2AFO and 2LY also busy from the Mountains on the V.H.Fs.

VICTORIA

Secretary: A. B. D. Evans, VK3VQ,
Box 2611 W.G.P.O., Melbourne.

Meeting Night: First Wednesday of each month.

Meeting Place: Radio School, Melbourne Technical College.

COUNCIL JOTTINGS

At the last Annual General Meeting held on 6th August, 1947, the following office-bearers were elected and is published herewith for your information: President, R. H. Cunningham (VK3ML); Council: A. E. Tinkler (3ZV), M. J. McCartney (3KV), E. M. Hooper, H. Webber (3PW), H. N. Stevens (3JO), C. C. Quinn (3WQ), H. Chapman (3GU), W. L. Maters (3WW).

At the first Council meeting for the year a new post was created in the form of Communications Manager for the administration and operation of VK3WI. Mr. A. E. Tinkler (3ZV) was appointed to fill the position.

In view of the excellent management of the previous Magazine and Disposals Committees all these members were re-appointed to carry on the good work.

Financial affairs of the Division have been so capably handled by Mr. J. Marsland (3NY) in the past, his re-appointment as Treasurer was completely unanimous.

Publicity and Magazine Notes were placed in the hands of M. McCartney (3KV). All Zone and Committee Secretaries are asked to forward notes on the month's activities direct to 3KV before the 12th of each month to ensure publication.

There was the usual full attendance at the September general meeting held on the 3rd of the month. Visitors present included Bill Marshall (VK2XM), Ray Bennett (VK5RC), also G. Russell, W. Robins and W. Manning.

Before the commencement of general business for the evening an educational film on the basic principles of Loran (Long Range Navigation) was shown.

VK3KM raised the issue of the appointment of a paid, full-time secretary to handle the affairs of the Victorian Division. It was generally felt by all present that an appointment of this nature is highly desirable and it was left to the Council to investigate the ways and means.

FIRST POST-WAR DINNER

The Victorian Division will hold their first post-war Dinner at the "Hotel Federal" on Saturday, 22nd November. Tickets for the Dinner are 10/- and may be obtained on application to the Secretary, together with price of ticket.

TECHNICAL ADVISORY COMMITTEE NOTES

T.A.C. Executive.—At the last meeting of the Executive, consideration was given to the purchase of additional laboratory and testing equipment to cover future planning. From several sources have come requests for technical articles of a more practical nature. The Committee appreciate these comments, but would point out, that without the help and interest of the Amateur who has something of a practical nature to offer, nothing can be done at present. The Committee, at the moment, is seeking a practical article on a Ham built amateur-band receiver. Can you help? If so, contact the T.A.C. Secretary, VK3UM, at the earliest. Meeting night is the third Tuesday.

V.H.F. Group.—At the last meeting of this group, a chairman and vice-chairman were elected for the current year, 3ACM Col McKenzie filling the chair, and 3XA Don Hope, the vice-chairman. A resume of the recent Field Day was given by 3LS and 3MB (shown in last month's notes as 3NE—our apologies), and it was decided to hold the next field day on the 9th November. 3LS (who has just returned from VK2) indi-



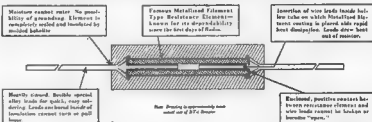
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cated the N.S.W. gang's willingness to co-operate in future field days. This gesture will be greatly appreciated by the VK3 boys. The field day for November would primarily carry out comparative tests on the horizontal and vertical polarisation of V.H.F. antennae. VK3RR then produced a nice looking 168 Mc. transmitter and described his difficulties in its construction, problems associated, and his methods of eradicating the bugs. The next meeting will be held to discuss V.H.F. receivers and converters and everyone interested is invited to bring along his pet. The

meeting night is the second Wednesday.

Receiver Group.—Mr. George Neilson delivered a very informative lecture on Crystal Filters and Selectivity in receivers at the last meeting of this group, and will continue on the same subject at the September meeting. A cordial invitation is extended to all. Meeting night is the fourth Wednesday.

General Meetings of Victorian Division.—At the October meeting a lecture on Frequency Modulation will be delivered by Mr. H. Kay, of the P.M.G.'s Department, and Mr. Morarty will give a lecture at the November meeting on Radiophysics and Propagation.

Standard Frequency Transmissions.—These transmissions take place on the 4th Tuesday in the month on the 7 Mc. band and include the Emergency Frequency of 6880 Kc.

Modulation Technique Group.—The inaugural meeting of this new group was held to discuss the various aspects and its subdivision into a.m., f.m., p.m., and pulse transmissions. Details will be given next month. The meeting night is the third Wednesday.

"FOOD FOR BRITAIN" APPEAL.

The Secretary of the R.S.G.B. has informed the Committee that parcels are now arriving regularly, and although damaged somewhat in transit, entailing repacking work at the R.S.G.B. HQ, the contents are still in good order. Another 25 parcels have been despatched, making the total 125.

Please make all donations payable to the "W.I.A. Food for Britain Patriotic Fund." You may alternatively contribute to the Fund by buying tickets in any of the following raffles:

- (S) Oct. 1.—A type T1092 transmitter, with second prize of a Taylor T20 triode.
- (4) Nov. 5.—A 9002, 9003, 6J6, and 455 Kc. crystal.
- (5) Dec. 3.—A Class "C" Wave-meter.

Tickets in each of the raffles are 1/- each, and may be obtained from the Appeal Secretary by postal note remittance. Further raffles are being planned by the Committee, so watch for the details.

Your Zone Organisers are as follows:—N-E Zone, 3YV, Howard Wohlers; N-W Zone, 3OA, I. T. Adams; C-W Zone, 3IQ, Kevin Duff; S-W Zone, 3QC, Bruce Plowman; E Zone, 3QZ, J. G. Colley.

At the general meeting on 3rd September, donations from the box collection was £8/5/10, a very good effort considering the inclement weather and small number present. The raffle of an 813 and socket was won by T. B. Clarke, Chetwynd East, a country member, and yielded a further £8/18/-. The total receipts to the Fund are now £153/12/1, expenditure on parcels £114/14/4, and cash in bank £38/17/0.

The Committee hope to announce

the details of a raffle of general interest soon, so keep tuned to VK3WI for the big news.

SOUTH-WESTERN ZONE

Since the last S-W Zone notes appeared there have been two hook ups, viz: 2nd August and 6th September. For the benefit of those who may not know, our hook up now commences at 10 a.m. on the first Sunday in each month.

In view of the fact that our next Convention is to take place the first week-end of November, and details have yet to be worked out, we want a full muster at our next hook up and it is possible a further meeting may be arranged nearer to the Convention date to check up on the number of chaps who will be going and other details.

The winners in the S-W Zone DX Contests were 3HG, c.w. contest, and 3KX, phone contest.

The Ballarat fellows got together this month to work out the details for an emergency communication service and the meeting was very well attended. Those present were 3ALM, 3IV, 3SE, 3BI, 3AJR, 3ARB, 3HW, 3ABT, 3BE, 3ASV. There are some inquiries under way at the moment and when answers to these are received, another meeting will be held and more concrete arrangements made.

We have already been asked to co-operate in a scheme by the local Fire Officer, Mr. H. Elburn, and the sooner some tests are made and exercises carried out the better as the summer is not very far away.

The Secretary (VK3BI) would be pleased to hear from other centres about any activity along this line so it can be given publicity in "A.R."

NORTH-EASTERN ZONE

On the Field Day many tests were carried out at Avenel. They were mobile marines. I believe from the amount of water the boys went through. Transmitters were used without antennae and provided good communication two miles apart. A 5" screwdriver was 3UT's antenna and did a f.b. job.

Receivers and transmitters, with and without antennae did good work at the distance and mobile.

Some of the lads heard phone harmonics from aircraft. One announcement stated they were 50,000 feet above Seymour.

Congratulations to Mac, 3XZ, on the arrival of another junior op. 3XZ and 3WR have been busy building a transmitter for 3APB. Final is a pair of p.p. tens. 3YV has a new transmitter in operation and hopes to have details for next month. 3AT was contacted on phone, although his profession is keeping the rig off the air temporarily.

WESTERN ZONE

The first monthly hook up took place as arranged on Sunday, 14th September at 10 a.m., a good roll up

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CANTERBURY, E.7.

of members resulting. Those present being 3GN, 3ATR, 3YW, 3TA, 3EP, 3AGB, 3AKW, with 3AKP coming in late at the mike of 3YW.

A lengthy discussion took place in reference to conventions and field days for members of the Zone, and the general feeling seemed to be that more field days and less conventions would be of greater ultimate interest and benefit to members.

The subject is to be put on the agenda of the next convention to be held on the second Sunday in November at Maryborough, where the matter will be fully discussed and possibly a 50 Mc. field day arranged.

Interest in 50 Mc. work is definitely on the up-grade in the Zone and we should have a reasonable number of sets in operation before very long, so maybe you chaps in Melbourne will be turning your beams to the west before very long.

3GN went to Ballarat for the last 50 Mc. field day and came home heavily infected with the virus, so George is now busy with a 50 Mc. receiver and plans to do some 100 Mc. work as soon as Kevin Duff gets his call. 3GN has a parallel line osc. using a pair of CV6s. Also is putting his Type 2 Mark 3 permanently in the rack as an exciter for the 809s on the lower frequencies. ——— 3TA puts out a tremendous signal on 7 Mc. Sounds like 500 watts instead of 50, however Byron spends most of his short time on 14 Mc. these days, not so much QRM (wise guy) Byron is active on 60 Mc. and, in company

with Claude (3WC), should keep Horsham on the H.F. map.

3EP still puts out an excellent phone on 7 and 3.5 Mc. That P.M.G. mike of his certainly does a good job, not so much local noise on 7 Mc. Ted, but still the QRM is worse than 3.5 Mc. ——— 3AGB has been QRL, very much so. Not much radio to report, but by sounds of it there will be something doing in Horsham before long (look out Byron). ——— 3AKW puts out an f.b. sig. You are the best of the gang to get through the racket on 7 Mc. Bill.

3DP is still pounding away on c.w., but will be putting out phone soon, so that means more QRM, but why not, everybody's doing it. ———

3ATR is putting up V beams, so now the DX had better rewind their receiver coils with heavier wire. Nice phone you have Trev. ——— 3HL is very busy at present, had a house full for the holidays and now a flat full with shearing. However Allan still finds time to work a few Gs.

——— 3AKP's new QTH is not so hot. Line voltage lousy, official complaint to powers that be resulted in a new line being installed from the tranny and reports f.b. supply now. Keith works at the power house, say no more. ——— 3YW overworked trying to get something for these jolly notes. However is also suffering from acute six-metersitis, but is still in the theory stage. Don't suppose it will be long now.

Western Zone members please note: (1) Zone hook up on second Sunday

in month on 7050 Kc. (2) Next Zone Convention will be at Maryborough on second Sunday in November.

N-W ZONE CONVENTION AT KERANG

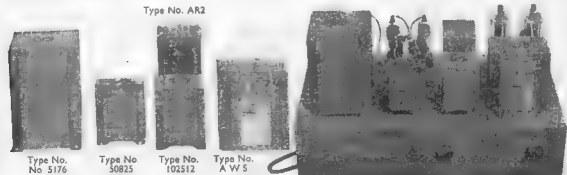
The small Ham population in the many thousands of square miles which constitute the N-W Zone is grouped mainly around Mildura and Kerang, which two centres are separated by nearly 200 miles of roadway. Attempts to get together having been defeated by the transport problem, the Kerang gang rallied around their key station 3TL and held their 1947 Convention in Kerang on 18th September.

The attendance was good when it is considered that the nine members who came along did a total of 560 miles of travelling for the day. Those present were VKs 3TL, 3CA, 3CE, 3HR, 3BM, "Bud" Page, "Chas" Stanford, "Wally" Loneland, Austin Morse and Vincent Trebilcock.

After lunch the gang called on 3OA and, having inspected the fine shackful of gear he has assembled in the few months he has held a ticket, we decided to up-end the 3 element 14 Mc. rotary beam on a forty-foot steel mast that was lying there ready for erection. It proved a lot tougher assignment than we had anticipated, but when finally Ham brains and brawn triumphed, the profusion of sweat was out-matched by the profusion of Ian's gratitude.

The thirsty gang then turned up at 3TL's in time for afternoon tea.

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Mrs. Treb's teapot was worked over-time and greatly appreciated. Having looked over 3TL's elaborate rig, which he truthfully claimed was the only one of its kind in the world, we settled down to the business.

3TL was elected President and key station; 3OA, Secretary-Treasurer and Food for Britain Organiser; 3BM, Mag. Correspondent and Publicity Officer. These three and a member, to be nominated by the Mil-dura gang, are to constitute the N-W Zone Committee. A long file of apologies and good wishes was received.

The N-E Zone motion that Zones collect W.I.A. Annual Subscriptions and deduct 2/- for local Zone expenses was unanimously negatived. During this discussion appreciation of the good work being done by honorary workers at headquarters was freely expressed, also the hope that a paid Secretary will be appointed, even at the cost of increased subs. The fine job being done by the Disposals Committee was commented on, the only criticism being that a fuller description of the goods on the application form would be appreciated.

VK3WI and the broadcasts were favourably mentioned. The idea behind the appointment of the Zone Publicity Officer was to try, through 3WI, to keep in closer touch with the dolings at headquarters and to promote there a better understanding of our needs and problems.

The Magazine came in for both bouquets and brickbats. The general idea was expressed that the technical articles, with notable exceptions, were too high brow and mathematical; a more practical and popular type would be preferred. We would like to see more station descriptions and personal paragraphs as in the pre-war magazine.

It was decided to have only one Convention per year, but to endeavour to arrange for a party of our members to visit the Conventions of adjoining Zones.

After contributing generously to the Food for Britain Appeal, the gang settled down to hear an informal talk by 3BM on "The Cathode Ray Tube for Ham Use." The speaker endeavoured to show how a simple five inch job for modulation checking could be built at a cost of less than £10 from Disposals equipment to work from either a.c. or batteries.

After dinner the gang inspected the Kerang power house and then adjourned to 3BM's shack, a mere 27 miles away. There the technical talk was followed up by a demonstration on the c.r.o. After examining the gear and various home-made electrical devices and sampling the XYL's supper, the gang set out in various directions for the long drive home.

3HR is busy servicing 'dozers, graders, etc., for the C.R.B., but puts out a good signal on 3.5 and 7 Mc. ——— 3CE recently installed an

807 in the final which promptly developed every sort of bug. Mostly on 3.5 Mc. Roy uses batteries and generator. ——— 3TL is about to erect a 28 Mc. rotary. We can only guess at what Treb said when he built his 28 Mc. Tx around an 815 (not haywire, either!), only to find the 815 was a dud and unreplaceable. ——— 3OA will soon be on 14 Mc. with his new rotary. Has a yard full of antennae and more planned.

3JG is too busy with a bumper citrus crop for Ham Radio. ——— 3LU is developing a No. 11 set into an f.b. eight tube super. Puts out a very nice phone signal on 7 Mc. Has been an experimenter since 1922, but only recently took out a ticket. Operates for the P.M.G. at Sea Lake ——— 3ZK hopes to stage his post-war comeback soon. ——— It is rumoured that Alf, of 3CH, may stage a comeback! ——— 3BM is gradually getting the gear together again and the antenna systems up so far are 7 and 3.5 Mc., but will be on 14 and 28 Mc. soon, then will tackle 50 and perhaps 168 Mc. with the co-operation of 3OA and 3LU.

The Northern gang is on every Sunday morning on 3.5 Mc. at 0930. All welcome, call the key station, 3TL.

QUEENSLAND

Secretary: R. Thorley, VK4RT, Box 638J, G.P.O., Brisbane.

Meeting Place: State Service Building, Elizabeth Street, City.

Meeting Night: Last Friday in each month.

The general meeting of the above Division was held at the State Service Rooms on Friday, 29th August. Owing to the unavoidable absence of the President (VK4AW), the chair was filled by Vice-President 4KB. The winners of the City-Country Contest were announced, 4TY for the City, and 4ER and 4HZ tieing for the Country. Prize money of One Guinea per person per win has been forwarded. Congratulations to the lucky people concerned.

Speaking of guineas, applications have been invited for a new QSL design for 4WI, and a prize of that amount will be paid to the originator of the winning design. The scheme has received quite a bit of publicity over 4WI, the closing date being 25th September, so if you haven't heard and would have liked to enter, we are sorry, but it really pays to listen to 4WI.

Indignation of a high order was expressed by several members (others probably muttered under their breath) at the proposed cut in Amateur Frequencies. At the time of writing we have not had any official advice, but the A.R.R.L. would hardly have put the news over unless it was the good oil (or bad oil). It was moved that a protest be for-

warded to Federal Executive, to see if something might possibly be done before the decision is ratified. News of a happier type was to the effect that approximately £15 of food parcels have been sent away to G land, but further donations are urgently needed. Just ask yourself in all seriousness, how do you expect the Gs to erect rotary beams, etc., and stay up nights working you fellows if they aren't adequately nourished. Thank you, send your donations to VK4FN, Dawn Street, Stafford Heights, Brisbane. All amounts re-

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The editorial "we" must be dropped for a moment, for me to announce that the general meeting saw fit to bestow on 4ZU the position of sub-editor of "Amateur Radio" in this State. Thanks fellows and I shall endeavour to give of my best and further the cause of Ham Radio, in whatever way possible. Part of the job is to collect articles for the magazine, so really you all have a part to play, and any assistance or suggestions in that respect will be very much appreciated. Frank Nolan, VK4FN, has kindly promised to act as assistant in the compilation of notes, etc.

Quite a highspot in the proceedings last general meeting night was the auction sale of apparatus donated by members to the Division, and also some for private sale. "Gus," 4XG, played the role of auctioneer, and if any talent scouts from the big firms were around we wouldn't be surprised to hear of "Gus" taking a new job any day now. After all it would be a change to go to a Disposals Sale and hear the auctioneer extolling the virtues of a transformer, which obviously is a tranny, instead of some of the weird specimens held up at recent sales. The affair netted the Institute a princely £14, and typical of the good buys was a Jan 813 which was knocked down for 7/6.

Membership of the Queensland Division is approaching the 150 mark, the greatest ever, and conspicuous among the new men are quite a number of associate members, would-be Hams, who evidently are attracted as a result of 4WI broadcasts. The distribution of "Amateur Radio" seems to have improved of recent months, and few complaints are received. One member, VK4HD has been missing out rather consistently however and would like the magazine people to check up.

We hear that Eric Lake (4EL) has now worked a total of 1,005 Gs. Of 518 contacts since January (G contacts) 310 have been new contacts. Eric will be remembered for the infamous treatment he used to mete out to the 45s in the final in pre-war days. The 45s are no more, the first post-war rig being an 801 (tritet on 3.5 Mc, doubler, etc., to 14 Mc.). On 28 Mc. the rig comprises a 6J5, 6N7, 807 exciter (a la the Handbook), driving a pair of 801s. The present rig starts off with a v.f.o., actually the r.f. section of a 208, driving the 6J5 in the above exciter, and an 806 in the final. A homebrew super and the same old 4EL standby, the vertical antenna have netted Eric 134 countries post-war, which methinks is quite a solid effort. Having worn out umpteen bugs, 4EL's latest baby is an Electronic Key.

On Friday, 12th September, the Council packed its bags and journeyed

ed to Ipswich for the express purpose of holding a Council meeting in that City, at the home of VK4KO. A pleasant evening was had, the Ipswich gang being present in force, to see what makes the W.I.A. tick. Apologies were received from Councilors Nolan and Neale, both of these chaps being on shift work. Ipswich Amateurs present were 4KO, 4WS, 4MW, 4CH, 4FW and 4ZB.

To assist the librarian (4LT) in his job, a system of zones has been set up in the State, and to assist the running of the Ipswich Zone, 4WS offered to act as Zone Manager for that section. Other Managers are 4HZ, Central Zone; 4HK, Tablelands; 4SN, Southern Zone; and 4EJ, Townsville. News from these men will be found elsewhere in the notes.

Treasurer 4ES suggested that a field day embracing the Ipswich men might be a good idea, and it is proposed to run one about the 12th of October, and at the same time to run 50 Mc tests for the benefit of those who are interested. It has long been the wish of the Brisbane gang to have a Brisbane-Ipswich link on 50 Mc, and we hope things may develop before too long.

Regarding student classes, 4KB, in answer to a question, explained the position in regard to rooms, lectures, etc., and the impracticability of doing anything at present, but speaking in support of Pat, 4AW said that it was hoped to do something about the matter in 1948.

At the conclusion of the meeting, President 4AW thanked Norm Hart 4KO for the cordial welcome extended by the Ipswichonians, and expressed the wish that reciprocal visits might be made. Thanks are also due to Mr. and Mrs. 4KO for refreshments served. Council, comprising 4AW, 4ES, 4KB, 4SN, 4EJ, 4LT and 4ZU departed for Brisbane at approximately 1130 p.m.

CENTRAL ZONE

4LN, at Gympie, is active on 50 Mc. Barrie is running calling-and-listening periods at 0700-0715 and 1900-1915 daily. The antenna sits atop a 110 ft pole. — 4XR is using a pair of 809s, grid modulated. He is an operator at 4GY. — 4HZ uses e.c.o. and Philips No. 4 receiver. Heard on 3.5 Mc. a lot. 4PG got amongst the VKs on 27th July using a four element beam. — 4AD getting amongst the Ws on 7 Mc. c.w. — 4XJ is busy erecting a new antenna. Will be on phone shortly.

TOWNVILLE ZONE

4EJ is having a busy time with 14 Mc. DX. 4QA is another 14 Mc. signal heard consistently at VK4SN.

SOUTHERN ZONE

4CU uses a three element beam and he worked six of the 12 VKs heard on 27th July. Was heard by VK7XL at S8. — 4SN worked eight VKs on 27th July using a vertical dipole. Is keen on getting his

W.A.S. (African) soon, only a couple of States to go. — 4KK also on 50 Mc. and was in the VK3 "party" on the 27th. — 4ER worked all Brisbane in the Contest. Eric is on 7 Mc. phone in the early mornings. — 4UX is putting out strong phone from Stanthorpe these days. Is on 7 Mc.

SOUTH AUSTRALIA

Secretary: E. A. Barbler, VK5MD,

Box 1234 K, G.P.O., Adelaide.

Meeting Place: 17 Waymouth Street, Adelaide.

Meeting Night: Second Tuesday of each month.

The monthly general meeting was held on Tuesday, 9th September, when Mr. Ted McGrath (VK5MO) gave an interesting lecture on "Some Aspects of Modulation." Many country visitors were present and also took the opportunity whilst in town for the meeting to visit the Royal Show, ho hum! Among the visitors were Messrs. Hancock (SRJ, Kadina), Wallbridge (5UX, Kadina), Hodgson (5AP), Peters, Brice, Martin, Hughes, Glover (Ponde, River Murray), Tregezza and Bell (Maitland).

Mr. McGrath (Ted to you) opened his lecture by alluding to the big responsibility which is carried by all phone Amateurs to see that their signals are as near perfect as they can be, because although it may only be a hobby, the powers that be who hear the signals we emit may one day take away our hobby if we do not radiate as pure a phone signal as we can. Phone signals being of such a complex nature are more likely to be faulty than are c.w. signals, thus most of the bad emissions on our Amateur frequencies come from badly adjusted phone stations.

The three main causes of bad phone signals may be divided into over-modulation, distortion and noise. The remedy for overmodulation lies either in turning back the gain or fitting some form of peak limiter which, however, brings in its train some form of band pass filter to bypass the harmonics generated by the clipping of the original frequencies. The remedies for distortion are too familiar to all to bear repetition and inherent noise and hum, the third main cause of bad phone, have been encountered by any amateur who has tried his hand at phone work.

Ted illustrated his remarks at all times on the blackboard, which fortunately for me, but unfortunately for the country reader, somewhat cramps the re-write. I might add that Ted did not introduce into his lecture anything that we have not read in the standard text books, but it is remarkable how much easier it is to appreciate the spoken instruction rather than that given in text books.

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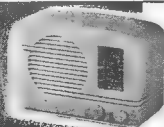
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ations at the close of the lecture, which was appreciated by all present and Mr. Les Safford (VK5LF) proposed a vote of thanks in a voice which had a definite resonant frequency round about 30 cycles and would be, I should say, one of the deepest voices ever to be heard at an Institute meeting.

Jack Coulter (VK5JD) arrived a little late and immediately launched into a long discussion with me on how rotten these notes are and how in VK3 they do things a lot different, "ad infinitum." If Jack ever gets off my back I'll be somewhat lacking my usual spur and probably turn in some good copy for once. What do you say Jack?

Attendance figures were down at the meeting, probably due to the counter attractions at the Royal Show. Although it was still a good attendance, some 80 odd, we are becoming somewhat blasé these days and call anything less than 100 members a poor attendance.

Judging by the disappointed looks on the "volves," the non-appearance of our only lady visitor upset some calculations and apparently some hair oil and new ties were entirely wasted.

Radio Amateurs were highly amused this week when Shirley Tracey, a 19-year-old girl from N.S.W., billed at the Royal Show as "Electral, the high frequency girl, who shocked a nation," received an electric shock in her tent after a performance and was subsequently admitted to the Royal Adelaide Hospital. Something akin to the jockey, who fell off a rocking horse!

In reply to the many telegrams, telephone calls and messages of congratulations to 5PS on his being heard on 50 Mc., he would like to say that it was no trouble at all. The sequel to this big event is that an 807 valve, which will cost the winner 25/-, will be given to the Amateur who can explain why 5PS was on duty at a commercial broadcasting station and yet was heard in a round table QSO on 50 Mc. at the same time. No mirrors were used and no rig was used by 5PS. You whistle and we will point.

They say that one can become used to anything if it is persisted with long enough, and apparently this is so because it has only just become apparent that "Count" Jack Stratford (VK5JS) has been missing from the air for some time due to a trip to the "bush" on business. We were so used to hearing Jack that we never missed him. Welcomed back.

A newcomer in Wykeham Bailey (VK5WM) is busy knocking over the DX on c.w., but is complaining about the QRM on 14 Mc. He said it is very discouraging. Wouldn't it!

Jack Lester (VK5LR) has moved to his new QTH at Brighton and is at present going around at night with an axe looking for any mast higher than twenty feet in the vicinity of

his shack. Survival of the fittest is the motto at Brighton.

Ross Harris (VK5FL) is back from a trip to VK3 and full of news of bargains available. Don't know just how much he brought back but isn't it marvellous how these Council chaps get on to the bargains. Despicable I call it, by the way Ross let me know next time you go, I could do with a little gear. Despicable, isn't it.

The new W.I.A. badges were available at the meeting and the general opinion was that they were a good job and would practically sell themselves. Quite a few members were comparing them with their old badges and all admitted the vast improvement in the new one.

Several members have suggested that this magazine could well include a "Hints and Kinks" column after the style of QST. I pass it on for what it is worth. (Some "Hints and Kinks" would be appreciated; let us have them.—Editor.)

Conditions on all bands in VK5 this month have been only fair and a couple of "Aurora Australis" did not improve things. Some peculiar effects were reported on 50 Mc., such as hearing a BBC foreign language broadcast for one to two hours straight and some odd W signals which however faded out too quickly to be deciphered. As these reports came from very reliable sources it gives one something to think over.

With such a large number of new Hams these days attending the meetings it is a good idea for the QSL officer to distribute the QSL cards as he does at present, thus making the Hams stand up and thereby become known to the rest of the gang.

NORTHERN TERRITORY NEWS

Activity in Ham ranks is increasing and at times QRM is heavy, but nevertheless it is good to see the chaps getting going. 14 Mc. is the favorite hunting ground.

Most active is Jack Pickles, VK5QV (ex-VK2QV pre-war). Rig is 6V6-807-807s parallel, 70 watts input and half-wave doubler has accounted for working of 37 zones. VK5SA, Bill Symons, has nice signal from 6V6 triet 807-809 final. Full wave zep on 14 Mc. is radiating end of the business.

VK5KL, Clarry Castle, active as usual on 28 and 50 Mc. After recent achievement in two-way contact with W7ACS/KH6 on 50 Mc. is keeping close watch on that band.

VK5CN at Berrimah is doing nicely on 14 Mc. using 6V6-807-807s parallel. Jack Marr, VK6AJ, fixed portable has been inactive for several months. Showing signs of building a 50 Mc. converter.

Noel Roberts, VK5NR, at Katherine (Voice of the North) shifting QTH to Darwin. A newcomer in Syd Morris, VK5AB, should be active shortly. 6V6 and 807 to start with, will be the line up. VK5AV, George Birm-

ingham is inactive. Receiver trouble is main cause.

Hillery McGrath, VK6AZ, will be some time before on the air. Has to build up from scratch. Nothing heard of VK5KI at Tennant's Creek. That is all now gang. Don't forget we will appreciate a call and yarn anytime, so note the above calls.

Thanks to VK5KL we are able to publish these notes from the "Forgotten Heart." We would like to hear of your doings regularly.—Editor.

WESTERN AUSTRALIA

Hon. Secretary: W. E. Coxon, VK6AG, Howard St., Perth, W.A.
Meeting Place: Builders' Exchange, St. George's Terrace, Perth.
Meeting Night: Second Monday in each month.

The September meeting fell on the 8th, and was well attended. The following members being present:—
6KJ, 6HL, 6LW, 6DF, 6RU, 6VZ, 6DJ, 6WT, 6JB, 6MB, 6TX, 6MY, 6FR, 6WH, 6AS, 6GA, 6GD, 6PW, 6FW, 6RB, 6RJ, 6SA, 6WW, 6GM, 6HM, 6RG, 6DN, 6RA, 6BG, 6LM, 6LS, 6RF, 6EV, 6EP, 6KB, 6DD, 6AG, 6GM, 6WS, 6JS, 6FL, 6KW, 3KU.

Among those present was VK6KU, Howard Love, who has been making a brief visit to VK6, and J. N. Paris, from VK6.

The membership of this Division is steadily growing, a few of our W friends who have settled in VK6 being among the new members.

Availability of certain Disposables material was discussed, and members were given the opportunity of ordering.

The evening was then given over to Lectures. 6DD had a Bendix Wavemeter built into an exciter unit for his new rig, which created considerable interest. 6SA gave a talk on WWV Schedules and how to apply the transmissions for calibration of Wavemeters. 6LW finished the evening with the first portion of his Lecture on Frequency Modulation principles.

This was enthusiastically received, but unfortunately, could not be concluded owing to the lateness of the hour. Wally will be continuing at the next meeting.

PERSONALITIES

6MW, consistent DXer at North Beach, seems to have changed from his former "rotary beam" mindedness, to a long wire antenna enthusiast. 6GM during a recent stay in hospital was heard on 7 Mc. with his "suit case" portable. We think George is gradually getting "bitten with the bug" again. 6AG now a "country" Ham at Darlington, often heard on 7 Mc. phone. 6LM is a stalwart on 7 Mc. with a f.b. signal. Keep the band warm Lionel. 6RU is now heard again day and night with his new array, motor driven. Jim has dispensed with his three element close spaced beam and now has a

three element wide spaced. 6X1 says Perth periodical visits and lets us know how Northam is being kept on the Ham Radio map.

6CM has been heard quite regularly lately both on 28 and 7 Mc. Modulation is good and Bill seems to be doing a fine job. 6DX, of Boulder fame, is often heard on 7 Mc. We don't know what activities are conducted on other bands though. What about some Goldfields news?

.... 8KW is another three element wide spaced 28 Mc. fan. Ron reckons results are far superior on this array to his previous four element close spaced beam. 61G one of those silent "Fremantleites." No one knows these days what goes on in our Port. What about letting us in on it lads? 6DF is reported working very hard on a new transmitter for V.H.F. Maurice has been listening on 56 Mc. quite a bit and soon should be heard down there with possibly F.M. as well as A.M. 6BC found that little strands of wire can cause some funny things to happen. Bert was "off the air" with a silent carrier, when one of these little strands of wire shorted out the modulation transformer recently.

6AP has gone tower minded. We believe Alf will soon have a tower erected with the necessary beams adorning the crown. 6EV is temporarily absent from the higher frequencies, owing to receiver trouble. Don't delay too long John, as 28 Mc. is coming good. 6FL has been working some nice DX on 28 Mc. lately with his new two element close spaced beam. 6DD's rebuilding efforts seem to be progressing favourably judging by the new exciter shown at the last meeting. 6HL has been experimenting with his arrays and obtaining some queer, but interesting, results.

During this last month conditions have shown a decided improvement over what they have been previously. Both the 14 and 28 Mc. bands being quite lively.

28 Mc. Phone—Europe.—Quite a few of these boys filtering through from 1800-2000 fairly consistently. G5DF, G6TD, G2IG, G6GO, F3HM and 111Y making good QSOs.

Africa.—Contacts with this Continent are becoming like local QSOs, particularly ZS. Some have put signals well over S9 in here, afternoon after afternoon lately, and many old acquaintances from last winter. ZS2BS, ZS2CI, ZS6IH, ZS1CG, ZS5AW, ZS6CM, ZS6GN, ZS5BY, ZS6EV were all f.b. signals, while VQ4NSH, VQ5ELD, ZE2JA, and our old stalwart SUHF were all enjoyable QSOs.

Asia.—The VU boys are gradually thinning out these last few months as most of them were Gs, and consequently gone home to England. A few in the form of VU2LR, VU2BF and VU2AJ are still left and may be

heard almost any day and sometimes up to 2200. CR9AG and ZC6RG were two nice contacts apart from the J2 and J9 boys who are too numerous to mention.

14 Mc. Phone—Europe.—This Continent has not yet broken through in the late evenings, but quite a few signals have been heard from 1400-1700, that is providing one can beat the QRM from VK2 and VK3. G4MS was the only contact made.

Africa.—Conditions have been quite flat in this direction practically any evening from 2100 onwards and should improve still further as the summer months draw closer. WD6DT, from Nyassaland, who must be the most sought after, Ham in this dark Continent, was a good QSO, while ZS6HW and ZS5M from the Union and ZE2JG, Southern Rhodesia, were the best contacts.

Asia.—All the usual J. C. K. A. and VS birds seem to pound in nightly at terrific strength no matter which way the beam is turned. J8AAB and J8ASC, from Korea, were the two best catches.

North America.—The Ws still are one's best bet nightly, and contacts are too numerous to mention. From Canada a few signals have been very good, the two best QSOs being VE4KF and VE3HI, the latter being worked due south from here.

Central America.—Some nice DX has eventuated from this area lately and these boys are always welcome QSOs. VP9F is getting very consistent on the high end of 14 Mc. band about 1730 daily. NY4CM, XE1FY, XE1RO and CO2KO were all fine contacts.

South America.—A few strays have appeared in the early evenings, but the only ones worked by VK6KW were HK1FQ and HK1BE.

TASMANIA

Secretary: J. Brown, VK7BJ
12 Thirza Street, New Town.
Phone V 1328.
Meeting. Place: Photographic Society's Rooms, 163 Liverpool Street, Hobart.

Meeting Night: First Wednesday of each month.

The re-building programme mentioned in last month's notes is still continuing, however most members state that their jobs are nearing completion and already quite a lot of good DX has been worked.

7DS has at last cleared the bugs out of his signal and he is now a far happier man. Hugh spends a lot of his time on 7 Mc. and he tells me that there is some good DX to be had on that band.

7BQ has successfully completed his 50 Mc. rig, together with a three element beam. At the time of writing these notes final adjustments are being made with the help of Perc Crawford, the "converter king."

7RK now has another antenna, this time it's a single wire fed matched

impedance. By the way Ray is working the Europeans, it looks as if this antenna may be the answer to his prayers.

7GD is now collecting parts prior to building up a transmitter. Geoff came staggering into BQ's shack a few days ago with a power transformer so large that Len dashed outside to see if he had brought the lamp pole as well.

7JH at Waddamanna writes in to say that DX is good up in the lake district and that 7XA has talked him into going on phone. Jack goes on to say that he was QSOing G5LI and George wanted to know where 7LZ was. He evidently doesn't know that 7LZ only works Europe once a year. We have sent George a food parcel to keep him alive until next September.

This month we welcome back on to the air two real old timers. Jack Wallace (7JW) and Ern Cooper (ex-7MK and now 7MC). Both Jack and Ern are starting on 7 Mc. and both are using phone.

Nothing has been heard of 7TE since he renewed his licence, however news via the grapevine states that Bill is at present building a 166 Mc. transmitter.

A Wide Range Crystal Filter For 455 Kc

(Continued from page 8)

It is important that the b.f.o. should be set to the correct frequency. This can be checked by tuning in a signal on the nose with the b.f.o. switched off. The b.f.o. should then be switched on and its frequency adjusted to give the desired pitch. In c.w. reception with the crystal at its sharpest, only the desired beat will be obtained, all other beat frequencies being very much weaker, and that beat will only be obtained on one side of zero beat and not both sides as with usual degrees of selectivity.

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Amateur Radio; October, 1947

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